bits of epidermal tissue sloughed from affected fish. They produce gametes that complete sexual fusion when the fish begin to die. Upon fish death, flagellated toxic cells (dinospores, planozygotes) form mostly nontoxic amoeboid stages or encyst and descend back to the sediments (Burkholder 1993).

The newly discovered estuarine toxic dinoflagellate does not form red tides; instead, its most toxic stage is ephemeral in the water column and usually contributes less than 10% of the total cells in the phytoplankton community (Burkholder *et al.* 1992). We first suspected that this type of toxic estuarine dinoflagellate existed only because it was accidentally introduced into fish cultures from local estuarine water (Smith *et al.* 1988, Noga *et al.* in press). Kills related to this dinoflagellate have been most frequent in the phosphate-rich Pamlico Estuary, and in the Neuse River near a recreational beach (Minnesott Beach) and a military air base (Cherry Point; Figs. 1, 2).

C. Objectives of This Research

This study was completed to obtain field and experimental information about the ecology of *Pfiesteria piscimorte* (nov.gen., nov.sp.), and its significance as a causative agent of major fish kills in the Neuse and Pamlico Estuaries. Specific objectives were to (1) obtain required information on the biology and life cycle of this toxic dinoflagellate to enable formal speciation; (2) establish a monitoring network comprised of state staff from the North Carolina Division of Environmental Management (NC DEM) and the North Carolina Division of Marine Fisheries (NC DMF), divisions of the North Carolina Department of Environment, Health & Natural Resources [NC DEHNR]), as well as volunteer citizens, aquaculturists and other scientists to help sample fish kills while in progress so that the dinoflagellate's presence could be accurately quantified; (3) determine optimal physical conditions for its toxic activity; (4) examine potential stimulatory effects of inorganic nitrogen and phosphorus enrichments (N_i and P_i, respectively) on the alga's growth and lethal behavior; (5) determine the dinoflagellate's effects on the skin and gill tissue of representative finfish; and (6) explore the potential for bio-control of the dinoflagellate by a protozoan ciliate, *Stylonichia*, and other natural predators if found. This information is contributed toward the ultimate goal of predicting toxic outbreaks by the dinoflagellate and mitigating its effects on our coastal fisheries.